IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Haochuan Jiang

Serial No.: 10/605,575 Group Art Unit: 1731

Filed: 10/09/2003 Examiner: John M. Hoffmann

For: POST PATIENT COLLIMATOR ASSEMBLY

Our Reference No: GEMS 0216 PUS

CERTIFICATE OF MAILING/TRANSMISSION (37 CFR §1.8(a))	
I hereby certify that this correspondence is, on the date shown below, being transmitted via EFS Web on.	
3/12/2008	Karen A. Hopf
Date	Karen A. Hopf

FOURTH REVISED BRIEF ON APPEAL

Mail Stop Appeal Brief – Patents
Commissioner for Patents
Box 1450
Alexandria, VA 22313-1450

Sir:

The following Appeal Brief is submitted pursuant to the Notice of Non-Compliant Appeal Brief mailed on February 12, 2008.

The Commissioner is authorized to charge any necessary fee to Deposit Account No. 07-0845.

I. Real Party in Interest

The real party in interest in this matter is the General Electric Company.

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-4 and 6-16 stand rejected in the Final Office Action dated February 9, 2007. Claims 17-22 stand withdrawn. Claim 5 has been cancelled from the case. A copy of the claims on appeal is attached as an Appendix.

IV. Status of Amendments Filed After Final

No Amendments were filed following the final rejection.

V. Summary of Claimed Subject Matter

The present invention is directed to a method of manufacturing a post patient collimator assembly. In certain medical imaging assemblies such as computer tomography imagers photons are absorbed by scintillator elements in order to produce the medical images. Collimator elements are uses in conjunction with the scintillator to limit the direction of photons as they approach the scintillator element. The cost of manufacture and the increasing accuracy if manufacturing tolerances press for improvements in the manufacturing process. The process and claims recite terms and process steps that the Applicant believes to be clear and concise and would be well understood by one skilled in the art. The Examiner believes these terms to be indefinite and unsupported. The present appeal will provide the Board with sufficient information by which to determine which position holds merit.

With reference to Figs. 1-6 and the description in paragraphs 18-21, Claim 1 recites a method for manufacturing a collimator assembly 10 (para. 18, lines 1-3) including the step of sintering a tungsten powder and a glass powder mixture to form a first collimator tube 14 (para 18, lines 10-19). A first core element 12 is placed within a first center collimator path 18 of the

first collimator tube 14 to create a first base-tube couple 16 (para 19, line 1-3). The couple cross-section 24 of the first base-tube couple 16 is then reduced such that the first base-tube couple 16 becomes a first single-fiber fiber 26 (para 19, lines 1-13, figure 3). The resultant single-fiber fiber 26 is then assembled into a collimator group 28 (para 19, lines 21-25). Finally the first core element 12 is dissolved such that a first hollow fiber 52 is generated (para 22, lines 4-7).

Claim 12 is also an independent claim which recites the essential limitations of claim 1 however broadly reciting a high-z powder rather than the tungsten powder recited in claim 1 (para 18, lines 8-20 reciting high-z glass, reciting the glass comprising a recitation of a plurality of high-z materials, and finally reciting that the scintering of tungsten powder (a high-z material) into glass powder to increase the density and x-ray stopping powder of the collimator tube 14). Claim 12 further recites a plurality of single-fiber fibers rather than the at least one recited in claim 1.

VI. Grounds of Rejection to be Reviewed on Appeal

The following issues are presented in this appeal:

A. Whether claims 1-4, 6-16 are properly rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement.

B. Whether claims 1-4, 6-16 are properly rejected under 35 USC 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter.

VII. Argument

A. The Rejection of Claims 1-16 Under 35 USC §112, First Paragraph

Claims 1-4, 6-16 were rejected under 35 USC 112, first paragraph as failing to comply with the written description requirements. The Applicant respectfully traverses and requests the Boards reconsideration. Claim 5 has been cancelled from the case.

- The Examiner states he could find no support for the newly claimed "sintering a high-z powder and glass powder mixture to form a first collimator tube". Respectfully, the Applicant requests reconsideration.
-
    - **The applicant quotes from the specification as filed:**

"It is further contemplated that **in one embodiment the collimator tube 14 may be comprised of any of the following ingredients:** lead oxide (PbO), bismuth oxide (Bi_2O_3), tantalum oxide (Ta_2O_5), tungsten oxide (WO_3), thorium oxide (ThO_2), hafnium oxide (HfO_2), silicon oxide (SiO_2), potassium oxide (K_2O), boron oxide (B_2O_3), aluminum oxide (Al_2O_3), gallium oxide (Ga_2O_3), germanium oxide (GeO_2), cerium oxide (CeO_2), and antimony oxide (Sb_2O_3)**. In still another embodiment, metal tungsten powder can be added to the glass and sintered in with the glass powder to increase the density and x-ray stopping power**. "

The Applicant asserts that this paragraph clearly describes making the collimator tube from tungsten powder sintered with glass powder.

Furthermore the very definition of **SINTERING** can be found consulting Wikipedia:

Sintering is a method for making objects from powder, by heating the material (below its melting point) until its particles adhere to each other. Sintering is traditionally used for manufacturing ceramic objects, and has also found uses in such fields as powder metallurgy.

From this definition and the above paragraph, no other conclusion is available to one skilled in the art that the specification is describing scintering tungsten powder and glass powder in a described embodiment to form the collimator tube 14. If this were not sufficient, claim 21 as filed further reinforces this:

"said drawn glass collimator tube comprises tungsten powder sintered into glass powder". The definition of sintering would not allow the Examiner's construction suggesting that sintering somehow turns tungsten powder into glass powder. Instead, anyone skilled in the art would clearly understand the specification and claim to be describing a glass tube formed by sintering glass powder and tungsten powder together.

The Examiner has failed to provide any support for his assertion that glass powder and tungsten powder cannot be sintered into a glass tube as claimed. His sole basis is that these

two ingredients (glass and tungsten) are taught by MacCragh to make cerment. The Applicant respectfully disagrees with this assertion.

- The Applicant calls the Board's attention to the Webster's New World Collegiate dictionary 3rd edition which defines cermet as:
  - "a mixture of ceramic material and metal, that is tough and heat resistant; used in gas turbines, nuclear reactors, rocket motors, etc.
  - Glass with a small amount of metal mixed in does not cease to be glass and surely does not become cerment. No more so that reflective metallic particles (done for tinting) put in an automobile windshield turn the windshield into a cerment windshield instead of a glass-windshield. The Examiner has failed to provided support for the argument that sintering tungsten with glass cannot result in glass but only results in cerment. The MacGragh reference does not support this argument. It simply states that in some proportions, tungsten and silicon may be combined to form cerment. MacGragh does not define cerment. If a single particle of tungsten was added to glass would it still be cerment or would it still be glass? MacGagh is silent on this fact. Furthermore, glass is NOT silicon alone.
  -

B. The Rejection of Claims 1-4, 6-16 Under 35 USC §112, Second Paragraph

Claims 1-16 were rejected under 35 USC §112, second paragraph, as indefinite. The Applicant respectfully traverses and requests the Board's consideration.

- The Examiner argues that claim 9 contains new limitations which are not supported "even remotely". The Applicant calls the Board's attention to the specification as filed:
  - "After fusion of the block 36, a disc 44 can be cut off of the block 36 across the fiber axis 46 (see figures 7 and 8). The disc 44 is preferably cut to a desired collimator depth 48. The desired collimator depth 48 can be determined by the scattering reduction requirements of the collimator assembly". It is well known in the art that the Purpose of tailoring a collimator depth is to affect is performance characteristics. There can be no doubt that no unsubstantiated limitations were added.

- The paragraph above clearly teaches that the block 36 can be cut to a desired depth and that the collimator depth 48 can be determined by tailoring it to collimator performance.

- The Examiner argues claims 4 and 6 go to alternate embodiments. The Examiner argues there is no basis for combining them and alludes to the use of the word "another" in the specification. The examiner is mistaken: tungsten powder and glass powder can be sintered into a high-z glass tube (see above) so claim 4 need not read on another embodiment. Furthermore, there is no conflict between the tungsten powder additive and the other additives described.
- The Examiner deems the term "high-z" indefinite. The Examiner is encouraged to consult just a few of the following resources to see that both the industry AND the patent office itself recognizes High-Z as a clearly defined term within the art:
  - **http://www.lanl.gov/quarterly/q_spring03/muon_text.shtml**
    - **wherein the well-recognized Los Alamos laws defines high-z as :**

> The new technique uses the fact that muons are more strongly deflected, or scattered, by nuclear or gamma-ray-shielding materials than they are by materials such as plastic, glass, and aluminum. This enhanced deflection occurs mainly because the atomic nuclei of nuclear and gamma-ray-shielding materials contain large numbers of protons, which exert large electrostatic forces on muons passing nearby. Since the number of protons is given by the atomic number Z, such materials are called "high-Z" materials.

OR Oxford Journals who utilized this term consistently when authors skilled in the art are writing papers:

http://rpd.oxfordjournals.org/cgi/content/abstract/17/1-4/67

http://rpd.oxfordjournals.org/cgi/content/abstract/33/1-4/183

But perhaps most tellingly the USPTO has issued patents utilizing the term high-z without concern for its indefiniteness:

4,208,577

4,269,899

6,519,313

The Applicant respectfully requests reconsideration.

VIII. Appendix

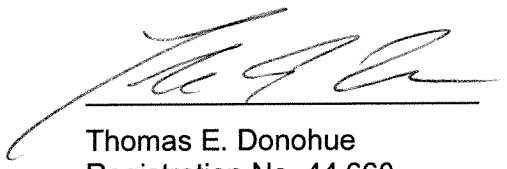
A copy of each of the claims involved in this appeal, namely Claims 1-4 and 6-16 are set forth and attached as Appendix A. Claims 17-22 that have been withdrawn from the case are set forth for completeness. Claim 5 has been cancelled from the case.

IX. Conclusion

For the foregoing reasons, Appellant respectfully requests that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge the fee for filing the Appeal Brief to Deposit Account 07-0845. Please credit any overpayment or charge any additional fees required in the filing of this appeal to deposit account 07-0845.

Respectfully submitted,



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Date: March 12, 2008

APPENDIX A

1. (Rejected/Appealed) A method of manufacturing a collimator assembly comprising:

sintering a tungsten powder and a glass powder mixture to form a first collimator tube;

placing a first core element within a first center collimator path of said first collimator tube to create a first base-tube couple;

reducing a couple cross-section of said first base-tube couple such that said first base-tube couple becomes a first single-fiber fiber;

assembling said first single-fiber fiber into a collimator group; and

dissolving said first core element such that a first hollow fiber is generated.

2. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein said reducing a couple cross-section comprises:

heating said first base-tube couple; and

drawing said first base-tube couple.

3. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein:

said first collimator tube comprises a cladding glass tube;

said first core element comprises a glass core; and

said first core element comprises a first glass transition temperature, said first collimator tube comprises a second glass transition temperature, said first glass transition temperature and said second glass transition temperature are substantially identical.

4. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises high-Z glass.

5. (Cancelled)

6. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises material taken from the group consisting of lead oxide, bismuth oxide, tantalum oxide, tungsten oxide, thorium oxide, hafnium oxide, silicon oxide, potassium oxide, boron oxide, aluminum oxide, gallium oxide, germanium oxide, cerium oxide, and antimony oxide.

7. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, further comprising:

producing a plurality of additional single-fiber fibers;

arranging said plurality of additional single-fiber fibers into a first multi-fiber bundle;

reducing said first multi-fiber bundle to generate a multi-fiber fiber; and

assembling said multi-fiber fiber into the collimator assembly.

8. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 7, further comprising:

producing a plurality of additional multi-fiber fibers;

arranging said plurality of additional multi-fiber fibers into a block; and

fusing said additional multi-fiber fibers.

9. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 8, further comprising:

slicing said block to a desired collimator depth such that a plurality of collimator assemblies may be produced from said block with varied collimating characteristics.

10. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein said dissolving said first core comprises:

placing said the collimator assembly into a water based acid bath.

11. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises an insoluble collimator tube; and said first core element comprises a soluble core element.

12. (Rejected/Appealed) A method of manufacturing a collimator assembly comprising:

producing a plurality of single-fiber fibers, each of said single-fiber fibers produced by:

sintering a high-z powder and a glass powder mixture to form a first collimator tube;

placing a core element within a center collimator path of said collimator tube to create a base-tube couple; and

reducing a couple cross-section of said base-tube couple such that said base-tube couple becomes a single-fiber fiber;

arranging said plurality of single-fiber fibers into a first multi-fiber bundle; and

dissolving said core elements such that a plurality of hollow fibers is generated.

13. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 12, further comprising:

reducing said first multi-fiber bundle to generate a multi-fiber fiber;

producing a plurality of said multi-fiber fibers;

arranging said plurality of multi-fiber fibers into a block; and

fusing said plurality of multi-fiber fibers.

14. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 12, wherein said reducing a couple cross-section comprises:

heating said base-tube couple; and

drawing said base-tube couple.

15. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 12, wherein:

said collimator tube comprises a cladding glass tube;

said core element comprises a glass core; and

said core element comprises a first glass transition temperature, said collimator tube comprises a second glass transition temperature, said first glass transition temperature and said second glass transition temperature are substantially identical.

16. (Rejected/Appealed) A method of manufacturing a collimator assembly as described in claim 12, wherein said dissolving said core elements comprises:

placing said core elements into a water based acid bath.

17. (Withdrawn) A collimator assembly comprising:

a plurality of hollow collimator fibers, each of said plurality of hollow collimator fibers comprising a drawn glass collimator tube having a center collimator path, said center collimator path maintained during said drawing by way of a core element positioned within said center collimator path, said center collimator path hollowed after said drawing by way of dissolving said core element.

18. (Withdrawn) A collimator assembly as described in claim 17, further comprising:

a plurality of multi-fiber fibers, each of said plurality of multi-fiber fibers comprised of a plurality of said hollow collimator fibers assembled and drawn into said multi-fiber fiber.

19. (Withdrawn) A collimator assembly as described in claim 18, further comprising:

a fused block of said plurality of multi-fiber fibers.

20. (Withdrawn) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises high-Z glass.

21. (Withdrawn) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises tungsten powder sintered into glass powder.

22. (Withdrawn) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises material taken from the group of lead oxide, bismuth oxide, tantalum oxide, tungsten oxide, thorium oxide, hafnium oxide, silicon oxide, potassium oxide, boron oxide, aluminum oxide, gallium oxide, germanium oxide, cerium oxide, and antimony oxide.

EVIDENCE APPENDIX

The evidence provided in this appeal was put before the Examiner in the September 22, 2006, response to a non-final office action. It was done so under a signed and attested office action by Applicant's attorney. This evidence was considered, entered, and found non-persuasive by the Examiner in his February 9, 2007 Final Office Action. The September 22, 2006 response by the Applicant and the February 9, 2007 Final Office Action have been provided as evidence in this appendix pursuant to 37 CFR 41.37(c)(1)(ix) as Attachment 1 and Attachment 2.

RELATED PROCEEDINGS APPENDIX

None.

ATTACHMENT 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Haochuan Jiang

Serial No.: 10/605,575 Group Art Unit: 1731

Filed: 10/09/2003 Examiner: John M. Hoffmann

For: TARGET ATTACHMENT ASSEMBLY

Attorney Docket No.: GEMS 0216 PA

I hereby certify that this correspondence is being transmitted via facsimile to the Examiner Hoffmann at (571) 273-8300 on:

September 22, 2006
(Date of Deposit)

(Signature)

AMENDMENT UNDER 37 CFR § 1.111

Mail Stop Amendment
Assistant Commissioner of
Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

This paper is in response to the Office Action in the above-entitled application, mailed June 6, 2006, and allowing three months for response. This response is timely because it is being filed within the allotted time period.

Please amend the above-identified application as follows:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Haochuan Jiang

Serial No.: 10/605,575 Group Art Unit: 1731

Filed: 10/09/2003 Examiner: John M. Hoffmann

For: TARGET ATTACHMENT ASSEMBLY

Attorney Docket No.: GEMS 0216 PA

I hereby certify that this correspondence is being transmitted via facsimile to the Examiner Hoffmann at (571) 273-8300 on:

September 22, 2006
(Date of Deposit)

Karen Hoppe
(Signature)

AMENDMENT UNDER 37 CFR § 1.111

Mail Stop Amendment
Assistant Commissioner of
Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

This paper is in response to the Office Action in the above-entitled application, mailed June 6, 2006, and allowing three months for response. This response is timely because it is being filed within the allotted time period.

Please amend the above-identified application as follows:

IN THE CLAIMS

1. (Currently Amended) A method of manufacturing a collimator assembly comprising:

sintering a ~~high-z~~ tungsten powder and a glass powder mixture to form a first collimator tube;

placing a first core element within a first center collimator path of said first collimator tube to create a first base-tube couple;

reducing a couple cross-section of said first base-tube couple such that said first base-tube couple becomes a first single-fiber fiber;

assembling said first single-fiber fiber into a collimator group; and

dissolving said first core element such that a first hollow fiber is generated.

2. (Original) A method of manufacturing a collimator assembly as described in claim 1, wherein said reducing a couple cross-section comprises:

heating said first base-tube couple; and

drawing said first base-tube couple.

3. (Original) A method of manufacturing a collimator assembly as described in claim 1, wherein:

said first collimator tube comprises a cladding glass tube;

said first core element comprises a glass core; and

said first core element comprises a first glass transition temperature, said first collimator tube comprises a second glass transition temperature, said first glass transition temperature and said second glass transition temperature are substantially identical.

4. (Original) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises high-Z glass.

5. (Cancelled).

6. (Previously Presented) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises material taken from the group

consisting of lead oxide, bismuth oxide, tantalum oxide, tungsten oxide, thorium oxide, hafnium oxide, silicon oxide, potassium oxide, boron oxide, aluminum oxide, gallium oxide, germanium oxide, cerium oxide, and antimony oxide.

7. (Original) A method of manufacturing a collimator assembly as described in claim 1, further comprising:

producing a plurality of additional single-fiber fibers;

arranging said plurality of additional single-fiber fibers into a first multi-fiber bundle;

reducing said first multi-fiber bundle to generate a multi-fiber fiber; and

assembling said multi-fiber fiber into the collimator assembly.

8. (Original) A method of manufacturing a collimator assembly as described in claim 7, further comprising:

producing a plurality of additional multi-fiber fibers;

arranging said plurality of additional multi-fiber fibers into a block; and

fusing said additional multi-fiber fibers.

9. (Previously Presented) A method of manufacturing a collimator assembly as described in claim 8, further comprising:

slicing said block to a desired collimator depth such that a plurality of collimator assemblies may be produced from said block with varied collimating characteristics.

10. (Original) A method of manufacturing a collimator assembly as described in claim 1, wherein said dissolving said first core comprises:

placing said the collimator assembly into a water based acid bath.

11. (Original) A method of manufacturing a collimator assembly as described in claim 1, wherein said first collimator tube comprises an insoluble collimator tube; and said first core element comprises a soluble core element.

12. (Previously Presented) A method of manufacturing a collimator assembly comprising:

producing a plurality of single-fiber fibers, each of said single-fiber fibers produced by:

sintering a high-z powder and a glass powder mixture to form a first collimator tube;

placing a core element within a center collimator path of said ~~a~~ collimator tube to create a base-tube couple; and

reducing a couple cross-section of said base-tube couple such that said base-tube couple becomes a single-fiber fiber;

arranging said plurality of single-fiber fibers into a first multi-fiber bundle; and

dissolving said core elements such that a plurality of hollow fibers is generated.

13. (Original) A method of manufacturing a collimator assembly as described in claim 12, further comprising:

reducing said first multi-fiber bundle to generate a multi-fiber fiber;

producing a plurality of said multi-fiber fibers;

arranging said plurality of multi-fiber fibers into a block; and

fusing said plurality of multi-fiber fibers.

14. (Original) A method of manufacturing a collimator assembly as described in claim 12, wherein said reducing a couple cross-section comprises:

heating said base-tube couple; and

drawing said base-tube couple.

15. (Original) A method of manufacturing a collimator assembly as described in claim 12, wherein:

said collimator tube comprises a cladding glass tube;

said core element comprises a glass core; and

said core element comprises a first glass transition temperature, said collimator tube comprises a second glass transition temperature, said first glass transition temperature and said second glass transition temperature are substantially identical.

16. (Original) A method of manufacturing a collimator assembly as described in claim 12, wherein said dissolving said core elements comprises:

placing said core elements into a water based acid bath.

17. (Original) A collimator assembly comprising:

a plurality of hollow collimator fibers, each of said plurality of hollow collimator fibers comprising a drawn glass collimator tube having a center collimator path, said center collimator path maintained during said drawing by way of a core element positioned within said center collimator path, said center collimator path hollowed after said drawing by way of dissolving said core element.

18. (Original) A collimator assembly as described in claim 17, further comprising:

a plurality of multi-fiber fibers, each of said plurality of multi-fiber fibers comprised of a plurality of said hollow collimator fibers assembled and drawn into said multi-fiber fiber.

19. (Original) A collimator assembly as described in claim 18, further comprising:

a fused block of said plurality of multi-fiber fibers.

20. (Original) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises high-Z glass.

21. (Original) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises tungsten powder sintered into glass powder.

22. (Original) A collimator assembly as described in claim 17, wherein said drawn glass collimator tube comprises material taken from the group of lead oxide, bismuth oxide, tantalum oxide, tungsten oxide, thorium oxide, hafnium oxide, silicon oxide, potassium oxide, boron oxide, aluminum oxide, gallium oxide, germanium oxide, cerium oxide, and antimony oxide.

Claim Rejections

Claims 1-16 were rejected under 35 USC 112, second paragraph as failing to comply with the written description requirements. The Applicant respectfully traverses and will address the Examiner's concerns herein.

- The Examiner states he could find no support for the newly claimed "sintering a high-z powder and glass powder mixture to form a first collimator tube". Respectfully, the Applicant traverses this rejection.
-
    - First off. The applicant quotes from the specification as filed:
    - "It is further contemplated that **in one embodiment the collimator tube 14 may be comprised of any of the following ingredients:** lead oxide (PbO), bismuth oxide (Bi2O3), tantalum oxide (Ta2O5), tungsten oxide (WO3), thorium oxide (ThO2), hafnium oxide (HfO2), silicon oxide (SiO2), potassium oxide (K2O), boron oxide (B2O3), aluminum oxide (Al2O3), gallium oxide (Ga2O3), germanium oxide (GeO2), cerium oxide (CeO2), and antimony oxide (Sb2O3). **In still another embodiment, metal tungsten powder can be added to the glass and sintered in with the glass powder to increase the density and x-ray stopping power**. "
        - This paragraph clearly describes making the collimator tube from tungsten powder sintered with glass powder.

Furthermore the very definition of **SINTERING** one need only consult Wikipedia to find:

> **Sintering** is a method for making objects from powder, by heating the material (below its melting point) until its particles adhere to each other. Sintering is traditionally used for manufacturing ceramic objects, and has also found uses in such fields as powder metallurgy.

From this definition and the above paragraph, no other conclusion is available to one skilled in the art that the specification is describing scintering tungsten powder and glass powder in a described embodiment to form the collimator tube 14. If this were not sufficient, claim 21 as filed further reinforces this:

"said drawn glass collimator tube comprises tungsten powder sintered into glass powder".

The definition of sintering would not allow the misconstruction asserted wherein sintering approximates alchemy by turning tungsten powder into glass powder. Instead, anyone skilled in the art would clearly understand the specification and claim to be describing a glass tube formed by sintering glass powder and tungsten powder together.

- The Examiner has failed to provide any support for his assertion that glass powder and tungsten powder cannot be sintered into a glass tube as claimed. His sole basis is that these two ingredients (glass and tungsten) are taught by MacCragh to make cerment. The Applicant respectfully is confused at this rejection.
    - The Applicant calls the Examiner's attention to the Webster's New World Collegiate dictionary 3rd edition which defines cermet as:
        - "a mixture of ceramic material and metal, that is tough and heat resistant; used in gas turbines, nuclear reactors, rocket motors, etc.
        - Glass with a small amount of metal mixed in does not cease to be glass and surely does not become cerment. No more so that reflective metallic particles (done for tinting) put in an automobile windshield turn the windshield into a cerment windshield instead of a glass-windshield. The Examiner has provided NO support for the argument that sintering tungsten with glass cannot result in glass but only results in cerment. The MacGragh reference does not support this argument. It simply states that in some proportions, tungsten and silicon may be combined to form cerment. MacGragh does not define cerment. If a single particle of tungsten was added would it still be cerment? MacGagh is silent on this fact. Furthermore, glass is NOT silicon alone.

- The Examiner argues that claim 9 contains new limitations which are not supported "even remotely". The Applicant calls the Examiner's attention to the specification as filed:
    - "After fusion of the block 36, a disc 44 can be cut off of the block 36 across the fiber axis 46 (see figures 7 and 8). The disc 44 is preferably cut to a desired

collimator depth 48. The desired collimator depth 48 can be determined by the scattering reduction requirements of the collimator assembly". It is well known in the art that the Purpose of tailoring a collimator depth is to affect is performance characteristics. There can be no doubt that no unsubstantiated limitations were added.

- The Examiner argues claims 4 and 6 go to alternate embodiments. The Examiner argues there is no basis for combining them and alludes to the use of the word "another" in the specification. The examiner is mistaken: tungsten powder and glass powder can be sintered into a high-z glass tube (see above) so claim 4 need not read on another embodiment. Furthermore, there is no conflict between the tungsten powder additive and the other additives described.
- The Examiner deems the term "high-z" indefinite. The Examiner is encouraged to consult just a few of the following resources to see that both the industry AND the patent office itself recognizes High-Z as a clearly defined term within the art:
  - http://www.lanl.gov/quarterly/q_spring03/muon_text.shtml
    - wherein the well-recognized Los Alamos laws defines high-z as :

> The new technique uses the fact that muons are more strongly deflected, or scattered, by nuclear or gamma-ray-shielding materials than they are by materials such as plastic, glass, and aluminum. This enhanced deflection occurs mainly because the atomic nuclei of nuclear and gamma-ray-shielding materials contain large numbers of protons, which exert large electrostatic forces on muons passing nearby. Since the number of protons is given by the atomic number Z, such materials are called "high-Z" materials.

OR Oxford Journals who utilized this term consistently when authors skilled in the art are writing papers:

http://rpd.oxfordjournals.org/cgi/content/abstract/17/1-4/67

http://rpd.oxfordjournals.org/cgi/content/abstract/33/1-4/183

But perhaps most tellingly the USPTO has issued patents utilizing the term high-z without concern for its indefiniteness:

4,208,577

4,269,899

6,519,313

The Applicant respectfully requests reconsideration.

With this response, it is respectfully submitted that all rejections and objections of record have been overcome and that the case is in condition for examination on the merits.

Should the Examiner have any questions or comments, he is respectfully requested to contact the undersigned.

Respectfully submitted,

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Dated: September 22, 2006

ATTACHMENT 2

UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,575	10/09/2003	Haochuan Jiang	GEMS 0216 PA	2574

27256 7590 02/09/2007

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FEB 12 2007
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EXAMINER	
HOFFMANN, JOHN M	
ART UNIT	PAPER NUMBER
1731	

final OA 2m due 4-9-07
3m due 5-9-07

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Docketed in GEMS

ENTERED CPI
Date: 2-12-07
By:

Office Action Summary	Application No. 10/605,575	Applicant(s) JIANG, HAOCHUAN	
	Examiner John Hoffmann	Art Unit 1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2006*.

2a)☒ This action is **FINAL**. ✓ 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-22* is/are pending in the application.

4a) Of the above claim(s) *17-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 6-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This application contains claims 17-22 are drawn to an invention nonelected with traverse in Paper of 4/29/2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Examiner could find no support for the ~~newly claimed~~ "sintering a high-z powder and a glass powder mixture to form a first collimator tube".

First it is noted that there is no mention of any "mixture" or "high-z powder" in the specification. Second, the only mention of any glass powder is at [0018] which refers to "the glass powder" but there is no prior mention of this powder: but there is no indication

that it is used to form a collimator tube. Moreover, the only prior mention of glass is "high-z glass" (also of [0018]), thus it is deemed that the tungsten powder embodiment is directed to adding tungsten to *the (high-z) glass* .

Third, as per at least claim 4: the tube is glass, but as evidenced by MacCragh 3713816, when silica and tungsten powders are sintered together, the result is a cerment. Thus, MacCragh suggests that to one of ordinary skill reading the present disclosure would interpret that the "powder" embodiment does not result in a glass tube. Thus, the disclosure fails to reasonably convey that at the time of filing that applicants had possession of forming a glass tube by mixing the two powders.

Fourth, as per MPEP 2163 II) A) 2) a) ii)

> >The disclosure of only one species encompassed within a genus adequately describes a claim directed to that genus only if the disclosure "indicates that the patentee has invented species sufficient to constitute the gen[us]." See Enzo Biochem, 323 F.3d at 966, 63 USPQ2d at 1615

Thus for the "high-z powder" genus, applicant's disclosure of only one specie (tungsten powder) does not indicate that patentee had invented species sufficient to constitute the genus. [0018] refers to different embodiments. The last embodiment is directed to sintering tungsten metal powder – there is no other mention or even suggestion of other metals, or other powders. Thus there is no indication that applicant had invented other species which would be sufficient to constitute the genus.

Also, there is no support for the dependent claims which call for a glass tube: because there is no disclosure of any glass tube that is made by two powders. The only disclosure of two powders is for the tungsten embodiment – there is nothing which

suggests that such results in a glass. As per MacCragh – the result is a cermet not a glass. Thus it is presumed that one of ordinary skill would NOT interpret that the sintering of tungsten with glass would result in glass.

Claim 9: Examiner could not find anything remotely suggestive of the new limitations added to claim 9.

Claims 4 and 6: as per [0018], there are various embodiments. Claim 1 is directed to a/the powder embodiments. But claims 4 and 6 are directed to other embodiments. There is no basis for combining the embodiments, especially when the powder is described as being "another" embodiment.

Claim 1: there is no support for the "glass powder mixture".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1- 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1) The independent claims require sintering a "high-z powder and a glass powder mixture". Examiner cannot tell if it requires a "glass powder mixture" that is combined with the tungsten, or if it requires a mixture comprising the two powders (glass and high-z). There is no mention of any mixture in the specification so one cannot turn to the specification to tell what is meant.

The term "high-z" is indefinite as to its meaning. Examiner sees no indication, guideline or definition in the specification as to what constitutes a "high" level of z. Likewise, such does not appear to be an art recognized term. It is a "word of degree" which is imprecise unless a definition or guideline has been set forth in the specification or the term is otherwise well known in the art. See Seattle Box Co. v. Industrial Crating and Packing, Inc., 731 F.2d 818, 826, 221 USPQ 568, 574 (Fed. Cir. 1984). Accordingly, it is determined that one of ordinary skill in this art would not have been apprised of the scope of claims and therefore, determined that the claims are indefinite and fail to meet the requirement of 35 U.S.C. 5 112, second paragraph.

Response to Arguments

Applicant's arguments filed 12/12/2006 have been fully considered but they are not persuasive.

Applicant argues there is support for the sintering a high-z-powder... step by referring to the disclosure regarding the metal tungsten powder. This argument is only relevant to newly amended claim 1 – but does not support the sintering step of claim 12.

Applicant does not establish any connection between the tungsten powder and the high-z powder.

The arguments indicate the Office made an assertion that glass powder and tungsten powder cannot be sintered. Examiner could not find any such assertion, nor does Applicant point out where this assertion is made. Examiner notes that if examiner thought the invention could not be made, Examiner would have made a non-enablement rejection. No such rejection exists. The disclosed invention is fully enabled.

Regarding claim 9, applicant directs examiner to the specification. However applicant did not point to where in the specification Examiner should look. Examiner reviewed the specification when the rejection was made and could not find support and still cannot.

Regarding claims 4 and 6 it is argued that sintering the powders "can be sintered into a high-z glass tube (see above)". Examiner reviewed the "above" and could not see any mention of a high-z tube. Yes, there is creation of a tube – but there is nothing which supports the conclusion the tube is "high-z"; examiner could not even find the term "high-z" anywhere in the "above".

As to the assertion that there is "no conflict between the tungsten powder additive and the other additives" - this is not understood. No rejection is based on a "conflict" and examiner is unsure what this might mean.

As to the encouragement for review other resources – such is not persuasive. It does not point out any specific error in the rejection. Examiner previously considered

various references (in addition to the file wrapper) in trying to determine what the claim term means – nothing that applicant argues regarding other resources reasonably suggest that they have a definition. There is no evidence in application (nor is Examiner aware of any evidence) that the words "high-z" have any art-recognized meaning. Nor is there any guidance or definition in the specification that would allow one of ordinary skill in the art to understand the meaning of the words "high-z". Indeed, applicant has not referred to any portion of the specification or any evidence to define the scope of these words. Accordingly, it is determine that one of ordinary skill in this art would not have been apprised of the scope of claims and Therefore fail to meet the requirement of 35 U.S.C. 5 112, second paragraph. Nothing suggests as to what level of z is considered "high" and what is not "high". For example, one would not be able to ascertain whether 1% tungsten is "high" or not.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Hoffmann whose telephone number is (571) 272 1191. The examiner can normally be reached on Monday through Friday, 7:00- 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John Hoffmann
Primary Examiner
Art Unit 1731

2/5-07